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The Contribution of Artificial Intelligence to the Development of Education in Algeria: A Field Study in the Higher Education Sector from the Students' Perspective

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Abstract

This study investigates the contribution of artificial intelligence (AI) to the development of higher education in Algeria from the students' perspective. A multi-method approach was adopted, including descriptive-analytical, historical, and inductive methods. Data were collected through a questionnaire distributed to a sample of higher education students and analyzed using SPSS. Findings reveal that AI positively impacts higher education by improving academic performance, supporting scientific research, and promoting the adoption of modern technologies. Regression analysis confirmed a statistically significant positive effect of AI on higher education development. The study recommends enhancing AI integration in Algerian universities, providing training for both students and faculty, and ensuring adequate digital infrastructure. Additionally, the study offers opportunities for future comparative

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1.Introduction

Today, the world is witnessing a profound transformation due to the digital revolution, and at its heart, artificial intelligence stands out as a driving force that has brought about a qualitative transition in various fields. It is no longer viewed as a limited experimental tool, but rather has become a strategic pillar that changes the logic of work within organizations and opens new horizons for creativity and decision-making. Higher education stands out among the sectors most interacting with this transformation, as it is the space in which the future is shaped by preparing competencies, generating knowledge, and developing scientific research. The role of universities today is no longer limited to transmitting information, but has gone beyond that to become a field for designing innovative solutions and keeping pace with technological transformations. This reality has made adopting artificial intelligence an existential choice for universities, including Algerian universities, which have become called upon to engage in this wave to secure their presence on the global scene and ensure their contribution to sustainable development.

Study problem

Artificial intelligence is playing an increasing role in improving academic, research and technological processes, in addition to opening new future horizons. Despite these capabilities, the question still remains about the extent to which artificial intelligence contributes to the development of Algerian higher education, especially in light of the differences in students' responses depending on their personal characteristics. Hence, we ask the following question.

To what extent does artificial intelligence, in its various dimensions, impact the development of higher education in Algeria ?

Sub-questions

1. How does the academic dimension of artificial intelligence affect the development of higher education in Algeria ?
2. To what extent does the research dimension of artificial intelligence affect the development of higher education in Algeria ?
3. What is the impact of the technological/future dimension of artificial intelligence on the development of higher education in Algerian universities?
4. Do students' responses about the impact of artificial intelligence on higher education differ depending on their personal characteristics (gender, age, and specialization) ?

Study hypotheses

In order to answer the problem and the questions raised, we find ourselves faced with this main hypothesis:

- H_0 There is no positive impact of artificial intelligence in its various dimensions (academic, research, technological/future) on the development of higher education in Algeria at the level of statistical significance. $\alpha \leq 0.05$

The sub-hypotheses are as follows:

- H_0 There is no statistically significant effect between the academic dimension of artificial intelligence and higher education at the level $\alpha \leq 0.05$
- H_0 There is no statistically significant effect between the research dimension of artificial intelligence and higher education at the level $\alpha \leq 0.05$
- H_0 There is no statistically significant effect between the technological and future dimension and higher education at the level $\alpha \leq 0.05$
- H_1 There are statistically significant differences in students' responses about the impact of artificial intelligence on the development of higher education due to gender at the level $\alpha \leq 0.0$.
- H_1There are statistically significant differences in students' responses about the impact of artificial intelligence on the development of higher education due to age at the significance level $\alpha \leq 0.05$
- There are statistically significant differences in students' responses about the impact of artificial intelligence on the development of higher education due to specialization at the level $\alpha \leq 0.05$

Study objectives

Based on the importance of artificial intelligence in developing the higher education system, this study seeks to achieve a set of goals that would shed light on the extent to which artificial intelligence contributes to the development of higher education in Algeria. From this standpoint, a number of goals that this study seeks to achieve can be put forward, which are as follows:

- Discovering the availability of the technical infrastructure that allows the use of artificial intelligence tools within universities ;
- Measuring the extent to which students use artificial intelligence technologies in academic and research learning ;
- Analyzing the impact of employing artificial intelligence on developing innovation and creative thinking skills among university students ;
- Highlighting the relationship between the dimensions of artificial intelligence and the development of higher education.

Study methodology

The study relied on an integrated methodology that combines descriptive, analytical and inductive analysis to analyze the impact of artificial intelligence on Algerian higher education. The study population included Algerian university students, and a simple random sample of 100 participants was chosen to accurately represent the community. The data was collected through a questionnaire divided into axes related to personal data, artificial intelligence and higher education, and the dimensions of the independent variables and the dependent variable, and was processed using the SPSS program, relying on descriptive and deductive methods to clarify the participants' attitudes and measure the impact of the dimensions of artificial intelligence on the development of higher education.

2. Definition of the Study Variables

2. 2 Definition of artificial intelligence

Artificial intelligence is no longer a means of scientific luxury or futuristic imagination, but rather has turned into a driving force that changes the way we live, think and teach. It has become one of the most prominent and important modern concepts that have attracted the attention and interest of researchers, making it today one of the main pillars of digital transformation in various fields, especially higher education. Thinkers have disagreed about one unified definition of artificial intelligence, and in order to become familiar with the topic, we will try to address a group of definitions by some scientists and authors:

- John McCarthy defined artificial intelligence as a branch of science that seeks to develop machines and programs that can act and make decisions in a way similar to human intelligence, so that these systems can carry out complex tasks and adapt to different situations in a manner similar to human thinking . (Nassim، 2021، صفحة 21)
- It represents a branch of computer science that focuses on developing systems capable of simulating human mental abilities, such as learning, planning, reasoning, and decision-making, through the use of advanced algorithms, with the aim of enabling these systems to provide new services that were not previously available (Al-Jaloud، 1444 AH، صفحة 43).
- Procedural definition: It is the science and engineering of machines capable of replicating human intelligence and simulating his mental and behavioral abilities, through the use of algorithms and mathematical models, for the purpose of serving humans by performing complex tasks that require analysis, understanding, and interaction with the surrounding environment.

2. 2 Definition of higher education

Higher education has always been a mirror that reflects the aspirations of nations and directs the path of their renaissance. It is not just a space for imparting knowledge, but rather an engine for change and shaping the future. Algeria, as a country emerging from a long colonial era, has made this sector a priority to build a modern, competitive state. Hence, the study of the emergence and development of higher education in Algeria gains its importance in understanding how it moved from limited beginnings to a broad system that seeks to keep pace with global transformations. However, researchers differed in formulating a unified definition for it due to its multiple dimensions and goals. Below is a presentation of some definitions of higher education:

- ✓ Higher education is an advanced stage of study that comes after secondary education, provided by recognized universities, institutes and educational institutions, and aims to prepare competencies, develop scientific research, and form qualified human resources that contribute to the service and development of society. (Mohamed، 2023، صفحة 18).
- ✓ The Organization for Economic Co-operation and Development defines higher education as including all academic institutions, whether public or private universities, colleges and institutes, that provide post-secondary study programs that end with the award of a university qualification or its equivalent (Atris، 2018، صفحة 405).
- ✓ Procedural definition: It is an advanced educational stage that comes immediately after secondary education, offered within officially recognized institutions (universities or governmental or private higher institutes), and is characterized by a high degree of scientific specialization, where it prepares human competencies, produces knowledge and scientific research, and grants recognized academic or professional qualifications, in a way that contributes to the development of society cognitively, economically, and culturally.

3. Analyze the results and test the study hypotheses

a- Analyze the results and test the study hypotheses

- ➢ **The first axis** : Personal characteristics: In this section, we addressed the gender, age, and specialty of the respondents. After filling out the questionnaires, we obtained the following results:

⇨Distribution of the study sample by gender: Through the following table and figure, we reached the results regarding the distribution of the study sample by gender.

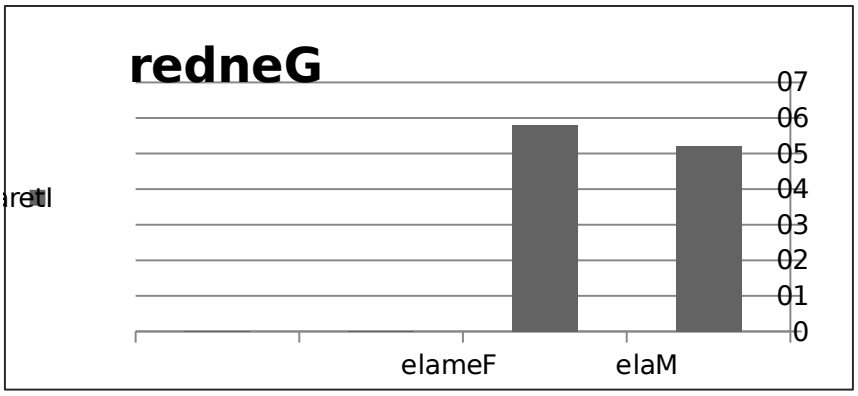
Table (1) : Distribution of the study sample by gender

Gender	Iteration	Percentage %
Male	***52***	***% 47.3***

Female	***58***	***% 52.7***
Total	***110***	***%100***

Source: Prepared by the researcher based on the outputs of the SPSS program

Figure (01): Distribution of the study sample by sex



Source: Prepared by the researcher based on the outputs of the SPSS program

Through the table and figure above, we have noticed that the percentage of females is greater than the percentage of males, where in the language the percentage of females is 52.7% with a frequency of 58 compared to 47.3% for males with a frequency of 52, and from here it can be said that females constitute the largest percentage in the study sample, which is an acceptable percentage.

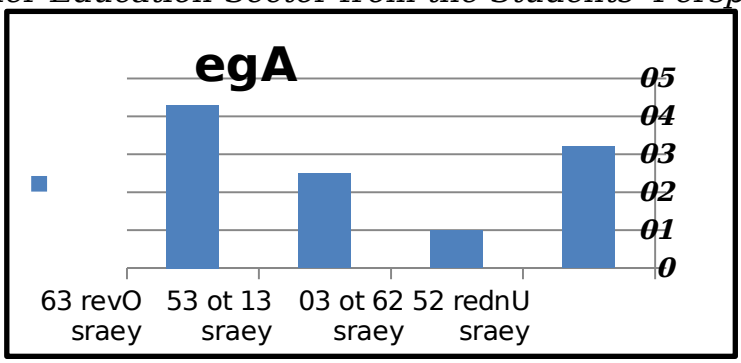
⇦ Distribution of the study sample by age: Through the following table and figure, we reached the results regarding the distribution of the study sample by age.

Table (02): Distribution of the study sample by age

Age	Iteration	Percentage %
Under 25 years	***32***	***% 29.1***
26 to 30 years	***10***	***% 9.1***
31 to 35 years	***25***	***% 22.7***
Over 36 years	***43***	***% 39.1***
Total	***110***	***% 100***

Source: Prepared by the researcher based on the outputs of the SPSS program

Figure (02): Distribution of the study sample by age



Source: Prepared by the researcher based on Excel and SPSS outputs

It is clear from the table that the largest age group in the sample is older than 36 years (39.1%), followed by the group under 25 years (29.1%). While the age group from 26 to 30 years represents the lowest percentage, reaching only (9.1%). This reflects that the majority of the sample is predominantly individuals of relatively older ages, with a significant attendance of young people under 25 years of age, giving the study a diversity of perspectives by age group.

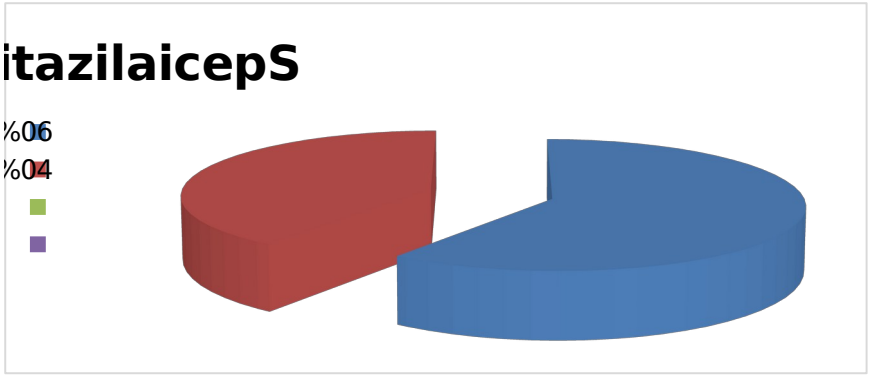
⇦ Distribution of the study sample by specialization: Through the following table and figure, we reached the results regarding the distribution of the study sample by specialization.

Table (03): Distribution of the study sample by specialization

Specialization	Iteration	Percentage %
Scientific	***66***	***% 60***
Literary	***44***	***% 40***
Total	***110***	***% 100***

Source: Prepared by the researcher based on Excel and SPSS outputs

Figure (03): Distribution of the study sample by specialization



Source: Prepared by the researcher based on Excel and SPSS outputs

Through the table and figure above, we note that the majority of the sample are those with scientific majors at an estimated rate of (60%) compared to (40%) for literary disciplines, and this indicates that the scientific specialization is in control of the study sample, and this may reflect a greater interest by students of scientific disciplines in the subject of study, while the contribution of literary disciplines remains relatively less but remains important to add diversity of visions.

b- Analysis and diagnosis of the results of the second and third axes:

- **The second axis :** Artificial intelligence and higher education : Here they discussed artificial intelligence and higher education in two parts :
  ⇦ Distribution of answers to the question: Do you use artificial intelligence to complete your work? Through the following table and figure, we reached the results regarding the distribution of the study sample on this question.

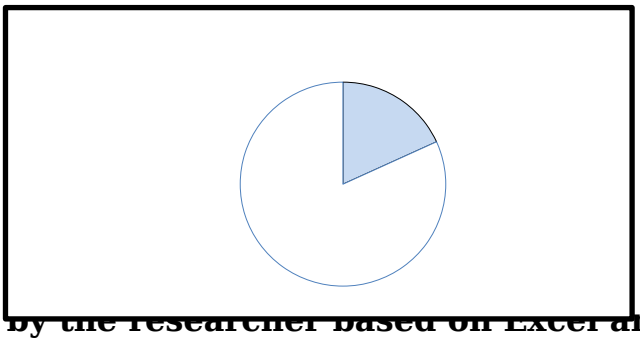
Table (04): Distribution of the study sample according to the question asked

Do you use artificial intelligence to complete your work?	Iteration	Percentage %
Yes	98	% 89.1
No	12	% 10.9
Total	110	%100

Source: Prepared by the researcher based on Excel and SPSS outputs

Figure (04): Distribution of the study sample according to the question asked

Do you use artificial intelligence to complete your work?



Source: Prepared by the researcher based on Excel and SPSS outputs

The previous table and figure show the opinions of the sample members about using artificial intelligence to complete their work: It

turns out that the overwhelming majority of the sample members (98 individuals (89.1%)) declared that they use artificial intelligence to complete their work, while only a small number (12 individuals (10.9%)) expressed that they do not use it, and this clearly indicates that artificial intelligence has become a tool. It is essential for students to accomplish their educational and research tasks, which reflects a high degree of awareness of its importance and potential. Also, the low rejection rate may be due to poor knowledge of technology or the lack of digital skills among some respondents**.**

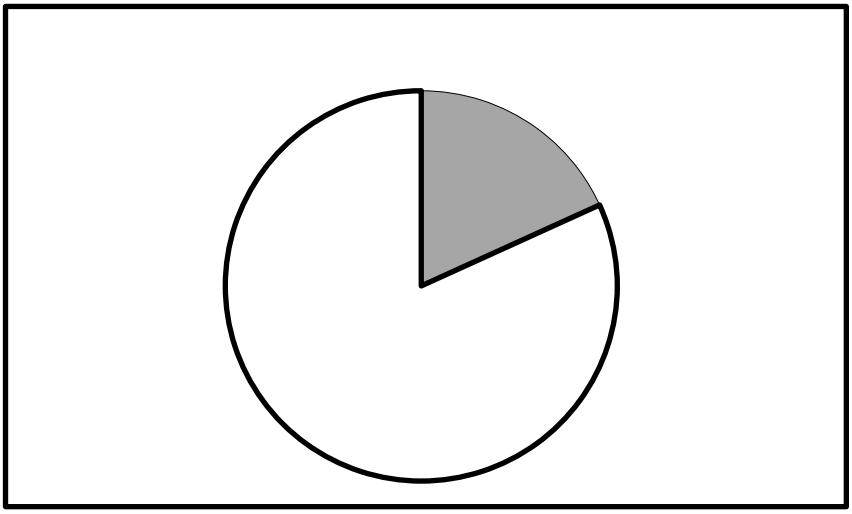
⇦ Distribution of answers to the question: Do these technologies provide you with the assistance you need? Through the following table and figure, we reached the results regarding the distribution of the study sample on this question.

Table (5): Distribution of the study sample according to the question asked

Do these technologies provide you with the assistance you need	Iteration	Percentage %
Yes	**94.5 %**	**104**
No	**5.5%**	**06**
Total	**110**	**%100**

Source: Prepared by the researcher based on Excel and SPSS outputs

Figure (05): Distribution of the study sample according to the question posed



Source: Prepared by the researcher based on Excel and SPSS outputs

The table and figure above illustrate the opinions of the sample members on the extent to which these techniques help in completing

the work: it is found that the overwhelming majority of the sample members are 104 individuals (95%). 5) They stated that these techniques help them to complete their work. While a small number of 06 individuals (5.5%) expressed that these technologies do not help them in accomplishing their work, this clearly indicates that artificial intelligence has become an essential tool for students in accomplishing their educational and research tasks, which reflects a high degree of awareness of its importance and potential. The low rejection rate may also be due to poor knowledge of technologies or the lack of digital skills of others.

- **Higher Education**

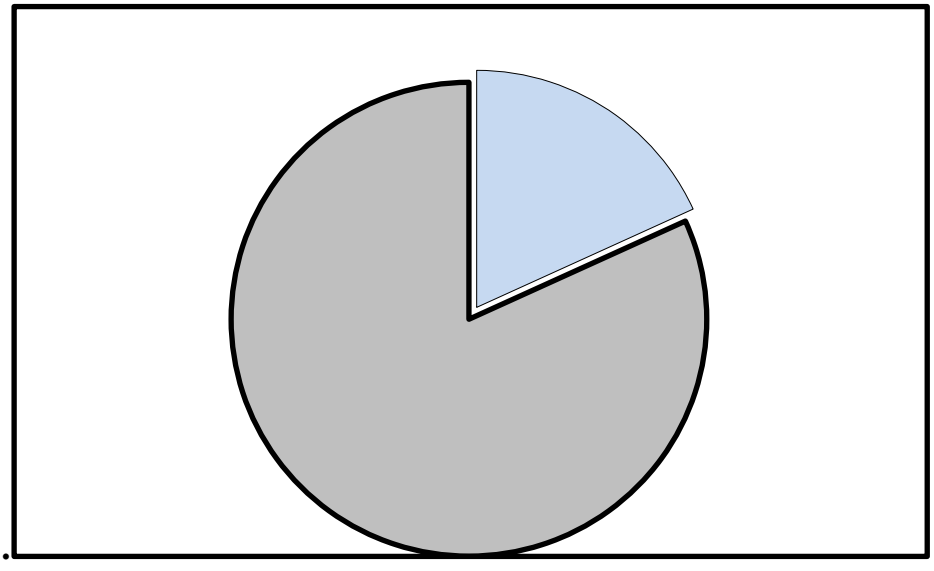
⇦ Distribution of answers to the question: Are the school curricula keeping up with the requirements of the labor market? Through the following table and figure, we arrived at the results regarding the distribution of the study sample on this question.

Table (06): Distribution of the study sample according to the question asked.

Are the curricula keeping pace with the requirements of the labor market?	Iteration	Percentage %
Yes	**18.2 %**	**20**
No	**%81.8**	**90**
Total	**110**	**%100**

Source: Prepared by the researcher based on Excel and SPSS outputs

Figure (06) Distribution of the study sample according to the question asked.



Source: Prepared by the researcher based on Excel and SPSS outputs

This table and figure represent the results of a question in the questionnaire that was processed using SPSS. The question was: Are the school curricula keeping pace with the requirements of the labor market? We note that the majority of the sample members believe that the school curricula are not keeping up with the requirements of the labor market (81.8%), while only a small percentage (18.2%) considered that they are keeping up, which reflects the existence of a clear gap between the outcomes of education and the needs of the market.

⇦ Distribution of answers to the question: Do you think there are sufficient opportunities for scientific research within the university? Through the following table and figure, we arrived at the results regarding the distribution of the study sample on this question.

Table (08): Distribution of the study sample according to the question asked

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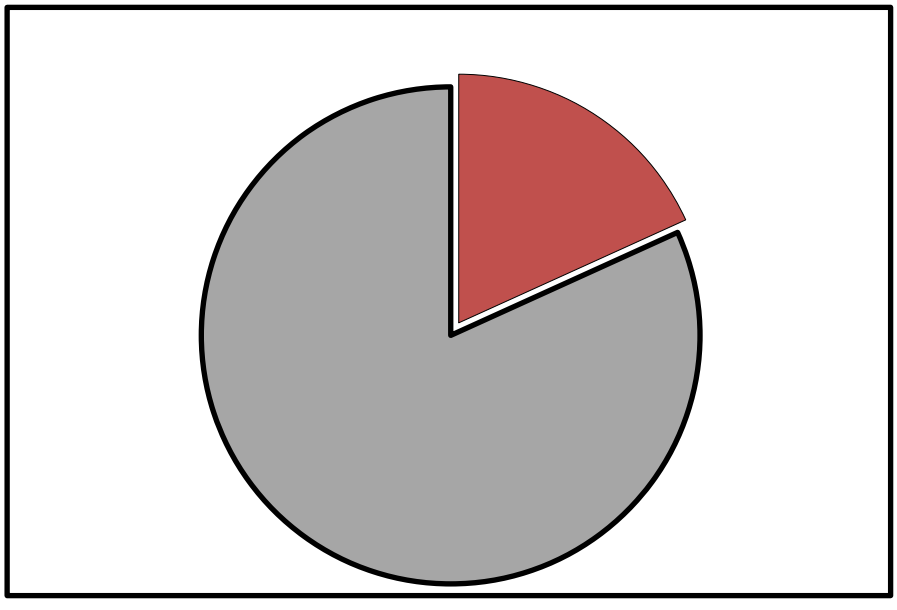
Do you think there are sufficient opportunities for scientific research within the university?	Iteration	Percentage %
Yes	**39.1 %**	**43**
No	**60.9 %**	**67**
Total	**110**	**%100**

Source: Prepared by the researcher based on SPSS outputs

Figure (06) Distribution of the study sample according to the



question asked

Source: Prepared by the researcher based on Excel and SPSS outputs

It is clear from the table and figure that the majority of the sample (60.9%) believe that the opportunities available for scientific research within the university are insufficient, while only (39.1%) reported that there are sufficient opportunities. This indicates a general awareness among students or professors of the weakness of the capabilities and conditions supporting scientific research at the university, which calls for more attention to providing the environment and resources necessary for its development.

- **Third axis:** A relationship between artificial intelligence and innovation in higher education: Here they discussed the relationship between artificial intelligence and innovation in higher education, that is, the effect of the independent variable on the dependent variable.

⇦ Distribution of answers to the questions. Through the following table, we arrived at the results regarding the distribution of the study sample to these questions**.**

Table (08): Arithmetic means and standard deviations for the academic dimension

	Items	Number	Arithmetic mean	Standard deviation	Degree of adoption
01	**The use of artificial intelligence contributes to improving teaching methods and providing innovative educational content.**		**3.81**	**1.079**	**High**
02	**Artificial intelligence helps in providing customized educational resources for each student (taking into account his different needs).**		**3.61**	**1.142**	**High**
03	**Artificial intelligence helps improve communication between students and professors through smart systems.**		**3.60**	**1.190**	**High**
04	**Artificial intelligence contributes to facilitating the evaluation of students' performance more accurately**		**3.28**	**1.250**	**Medium**
05	**Data analysis by artificial intelligence enhances accurate academic**		**3.37**	**1.195**	**Medium**

	decision-making.			
	Weighted arithmetic average	**3.534**		**High**

Source: Prepared by the researcher based on SPSS outputs

Table (09): Arithmetic means and standard deviations for the academic dimension

Number	Items	Arithmetic mean	Standard deviation	Degree of adoption
06	**AI helps analyze research data faster and more accurately.**	**3,81**	**1,027**	**High**
07	**Artificial intelligence contributes to improving the quality of scientific research within the university.**	**3.59**	**1.119**	**High**
08	**AI can support researchers by making scientific recommendations based on previous research.**	**3.81**	**1.079**	**High**
09	**Artificial Intelligence Encourages Innovation in University Research Projects**	**3.61**	**1.076**	**High**
	Weighted arithmetic average	**3.705**		**High**

Source: Prepared by the researcher based on SPSS outputs

Table (10) : Arithmetic averages and standard deviations of the technological/future dimension

Number	Items	Arithmetic mean	Standard deviation	Degree of adoption
10	**Artificial intelligence contributes to raising the level of technology within Algerian universities.**	**3.65**	**1.130**	**High**
11	**Universities need to modernize the infrastructure for the application of AI technologies.**	**4.28**	**1.050**	**Very high**
12	**AI helps in analyzing big data to improve educational performance.**	**3.74**	**1.106**	**High**

13	**Artificial intelligence could fundamentally transform higher education in the future.**	**3.99**	**1.121**	**High**
	Weighted arithmetic average	**3.915**		**High**

Source: Prepared by the researcher based on SPSS outputs

Table (11): Mathematical Averages and Standard Deviations of the Higher Education Dimension

Number	Items	Arithmetic mean	Standard deviation	Degree of adoption
14	**Higher education in Algeria seeks to develop its curricula to keep pace with the challenges of the future.**	**3.57**	**1.104**	**High**
15	**Higher education strives to keep pace with global developments in the field of artificial intelligence.**	**3.92**	**1.033**	**High**
16	**Higher education relies on technology to improve the quality of learning.**	**3.95**	**0.962**	**High**
17	**Higher education encourages the adoption of innovative teaching methods.**	**4.06**	**0.979**	**Very high**
18	**Higher education seeks to update the curriculum to keep pace with developments.**	**3.85**	**1.068**	**High**
	Weighted arithmetic average	**3.87**		**High**

Source: Prepared by the researcher based on SPSS outputs

The results of the study across the four dimensions showed that artificial intelligence represents an essential tool in the development of Algerian higher education, with varying levels of sample perception of its roles.

At the academic level, the first three paragraphs scored high averages ranging from (3.60-3.61-3.81), reflecting students' confidence in AI as a means of improving teaching methods, customizing content, and enhancing communication with professors. In contrast, the last two paragraphs came with an average score of B (3.37-3.28), highlighting the existence of reservations about the accuracy of evaluation and academic decision-making based on algorithms. This is explained by the fact that students are more receptive to AI in the education process than in the

assessment process, which still needs to boost confidence in its digital mechanisms.

At the research level, all paragraphs came in high (3.81 -3.59 – 3.61 – 3.81), which indicates a growing awareness among students of the role of artificial intelligence in analyzing data quickly and accurately, improving the quality of research, and making recommendations based on previous research. This explains that scientific research is the most reliant field on AI technologies within the university, due to its ability to save time and effort and support innovation.

At the technological/future level, paragraph (11) on infrastructure modernization received the highest arithmetic average (4.28) with a very high score, reflecting a strong perception among the sample that the optimal use of artificial intelligence is contingent on the development of technological capabilities within universities. The rest of the paragraphs ranged with an average of (3.65 - 3.99 - 3.74) only to a high degree, which confirms the students' conviction of the role of artificial intelligence in supporting distance education and bringing about a fundamental transformation in higher education patterns. This explains why students associate the effectiveness of AI with the viability of the university's infrastructure.

As for the dependent variable (higher education), the averages ranged between (3.57-4.06) with an overall average of (3.87), where paragraph (17) recorded the highest score (4.06), which reflects that higher education is seen as a space that seeks to keep pace with global developments by adopting technology and encouraging innovation. However, the renewal of the curriculum ranked lowest, which explains that there is a gap between the declared ambition towards modernization and the practical application that still needs to redouble efforts to develop the curriculum content in line with the current scientific and technological changes.

Based on the above, it can be said that the results of the study reveal a growing positive awareness of the importance of AI in teaching, research, and future planning of higher education, while emphasizing that curriculum and infrastructure development remains the greatest challenge to ensure effective investment of these technologies.

a. Testing the study hypotheses

Main hypothesis: From here, we will test the study hypothesis in the field, which was as follows:

- ✓ H_0 There is no positive impact of artificial intelligence in its various dimensions (academic, research, technological/future) on the

development of higher education in Algeria at the level of statistical significance

In order to prove or deny the validity of the hypothesis, we used linear regression analysis, and we divided the main hypothesis into sub-hypotheses:

- H_0 There is no statistically significant effect between the academic dimension of artificial intelligence and higher education at the level $\alpha \leq 0.05$.
- H_0 There is no statistically significant effect between the technological and future dimension and higher education at the level of $\alpha \leq 0.05$.
- H_0 There is no statistically significant effect between the technological and future dimension and higher education at the level $\alpha \leq 0.05$.
- H_1 There are statistically significant differences in students' responses about the impact of artificial intelligence on the development of higher education due to gender at the level $\alpha \leq 0.05$.

- H_1 There are statistically significant differences in students' responses about the impact of artificial intelligence on the development of higher education due to age at the significance level $\alpha \leq 0.05$
- H_1 There are statistically significant differences in students' responses about the impact of artificial intelligence on the development of higher education due to specialization at the level $\alpha \leq 0.05$.

Testing the first sub-hypothesis: which states the following:

- H_0 There is no statistically significant effect between the academic dimension of artificial intelligence and higher education at the level of $\alpha \leq 0.05$.
- Ң There is a statistically significant effect between the academic dimension of artificial intelligence and higher education at the level of $\alpha \leq 0.05$.

The test results were shown in the following table:

Table (12): Results of testing the first sub-hypothesis

Independent variable/dependent variable	**Higher education**			
	R	**^{2}R**	**T**	**Significance level**
	0.236	**0.056**	**2.529**	**0.013**

Source: Prepared by the researcher based on SPSS outputs

The results showed that the correlation coefficient (R = 0.236) indicates a weak but statistically significant direct relationship between the academic dimension and higher education, which means that the improvement of academic practices – such as teaching methods and curriculum development – contributes to a limited degree to enhancing the quality of higher education. The coefficient of determination (R^2 = 0.056) showed that the academic dimension explains only about 5.6% of the variance in higher education, which indicates that the latter is more dependent on other dimensions such as the research and technological/future dimension.

The value of (T = 2.529) and the significance level (Sig = 0.013 < 0.05) also confirm that the relationship between the two variables is statistically significant and can be trusted, i.e., the effect of the academic dimension on higher education is not due to chance. Accordingly, the null hypothesis (H_0) is rejected and the alternative hypothesis (H_1) that states that there is a statistically significant effect at a significant level ($\alpha \leq 0.05$) between the academic dimension a $y1=0,233 \times x' + 3,047$ epted. Based on the results of the linear regression analysis, the following equation was reached:

Where: **Y** represents higher education, and **X'** represents the academic dimension of AI.

- **Testing the second sub-hypothesis:** in which it is stated as follows:

- H_0 There is no statistically significant effect between the research dimension of artificial intelligence and higher education at the level of $\alpha \leq 0.05$.
- H_1 There is a statistically significant effect between the research dimension of artificial intelligence and higher education at the level of $\alpha \leq 0.05$

and the results of its test were shown in the following table:

Table (13): Results of the test of the second sub-hypothesis

Independent variable/dependent variable	**Higher education**			
	R	**^{2}R**	**T**	**Significance level**
	0.649	**0.421**	**8.867**	**0.000**

Source: Prepared by the researcher based on SPSS outputs

The results showed that the correlation coefficient (R = 0.649) reflects a strong direct relationship between the research dimension of AI and higher education, which shows that the enhancement of research practices contributes to a significant degree to the development of higher education quality. The coefficient of determination (R^2 = 0.421) also showed that the research dimension explains about 42.1% of the variance in higher education, which is a high percentage compared to the academic dimension, which shows that scientific research represents a key pillar in pushing higher education towards innovation and innovation.

The value of (T = 8.867) and the level of significance (Sig = 0.000 < 0.05) confirm that the relationship between the research dimension and higher education is statistically significant, i.e., the effect of the research dimension is real and strong. Accordingly, the null hypothesis ($_{0}$H) is rejected and the alternative hypothesis ($_{1}$H) that states that there is a statistically significant effect at the level of ($\alpha \leq 0.05$) between the research dimension of AI and higher education is accepted. Based on the results of the linear regression analysis, the following equation was reached:

$$y=0{,}580 \times x'' +1{,}723$$

Where: **Y** represents higher education, and **X''** represents the research dimension of AI.

- **Testing the third sub-hypothesis:** which is formulated as follows:
- H_0 There is no statistically significant effect between the technological and future dimension and higher education at the level of $\alpha \leq 0.05$.
- H_1 There is a statistically significant effect between the technological dimension and the future and higher education at the level of $\alpha \leq 0.05$

And the results of its test were shown in the following table :

Table (14): Results of the test of the third sub-hypothesis

Independent variable/dependent variable	**Higher education**			
	R	**^{2}R**	**T**	**Significance level**
	0.774	**0.599**	**12.688**	**0.000**

Source: Prepared by the researcher based on SPSS outputs

Technological and Futuristic

The results of the regression showed that the correlation coefficient was R=0.774, indicating a strong and direct correlation between the technological/future dimension and higher education. The coefficient of determination R^2=0.599 also showed that this dimension explains about 59.9% of the variation in the level of higher education, which is a high percentage that reflects the great importance of technology and future trends in the development of university education. In addition, the value of T=12.688 came at the significance level of Sig=0.000<0.05, which confirms that the impact is statistically significant, i.e. the relationship between the technological/future dimension and higher education is strong.

Accordingly, the null hypothesis (H_0) is rejected and the alternative hypothesis (H_1) is accepted which states that there is a significant effect of the technological/future dimension in higher education at the significance level of α≤0.05 and based on the regression analysis, the following equation is reached :

$$y=0,751 \times x''' +0,934$$

where **Y** represents higher education, and x''' represents the technological/futuristic dimension of AI.

- **Testing the fourth sub-hypothesis**: which was formulated as follows
- **H_0** There are no statistically significant differences in students' responses about the impact of artificial intelligence on the development of higher education attributable to gender at the level of α≤ 0.05.
- **H_1** There are statistically significant differences in students' responses about the impact of artificial intelligence on the development of higher education attributable to gender at the level of α≤ 0.05.

Table (15): Results of the test of the fourth sub-hypothesis

Nature of Variation	Levin Test		Test t	
	Sig	F	Sig	t
Homogeneous	0.166	0.920	0.340	-1.393
Heterogeneous				

Source: Prepared by the researcher based on SPSS outputs

The results of the Levin test showed that the significance value (0.340) was greater than the significance level (α = 0.05), which confirms the achievement of the condition of homogeneity of the variance between

males and females. The results of the t-test also showed that the significance value of (0.166) is greater than (α = 0.05), which means that there are no statistically significant differences between the averages of students' responses according to gender regarding the impact of artificial intelligence on the development of higher education. Thus, the null hypothesis (H0) is accepted and the alternative hypothesis (H1) is rejected, i.e., gender is not an influential factor in students' perceptions of the role of artificial intelligence in the development of higher education.

- **Testing the fifth sub-hypothesis** : which was formulated as follows :

- **H_0** There are no statistically significant differences in students' responses about the impact of AI on the development of higher education attributable to age at the level of α≤ 0.05.
- **H_1** There are statistically significant differences in students' responses about the impact of artificial intelligence on the development of higher education attributable to age at the level of α≤ 0.05 .

Table (16): Results of the test of the fourth sub-hypothesis

Univariation	Sum of squares	degree of freedom	F	Sig
Between groups	3.274	3	1.579	0.199
within groups	73.253	106		
Total	76.527	109		

Source: Prepared by the researcher based on SPSS outputs

The results of the one-way variance test showed that there were no statistically significant differences in students’ responses about the impact of artificial intelligence on the development of higher education due to age differences. The test value did not reach the required level of significance (α≤ ≤ 0.05), which means that artificial intelligence is seen as a common developmental factor among all age groups, without a noticeable difference between them. Thus, the null hypothesis 0H is accepted. There are no statistically significant differences in students’ responses about the impact of artificial intelligence on the development of higher education due to age at the level α≤ ≤ 0.05, and the alternative hypothesis is rejected Ḥ There are statistically significant differences in students’ responses about the impact of artificial intelligence on the development of higher education due to age at the level α≤ 0.05, which reflects that the impact of artificial intelligence The development of higher education is relatively homogeneous among different age groups of students.

- **Testing the sixth sub-hypothesis**: which came as follows:

- **H_0** There are no statistically significant differences in students' responses about the impact of artificial intelligence on the development of higher education due to specialization at the level α≤ 0.05
- **H_1** There are statistically significant differences in students' responses about the impact of artificial intelligence on the development of higher education due to specialization at the level α≤ 0.05.

Table No. (17): Results of testing the sixth sub-hypothesis

Nature of Variation	Levin Test		Test t	
	Sig	F	Sig	t
Homogeneous	0.065		0.065	0.213
Heterogeneous		3.472		

Source: Prepared by the researcher based on SPSS outputs

The results of Levene's test indicate that the value of the significance level (Sig = 0.065) is greater than (0.05), which means homogeneity of the sample variance according to specialization (scientific/literary). Accordingly, we relied on the results of the (T) test, which showed that the significance value (Sig = 0.065) is also greater than (0.05). This shows that there are no statistically significant differences in students' responses about the impact of artificial intelligence on the development of higher education due to specialization. That is, students, whether they are from scientific or literary majors, adopt approximately the same attitudes and trends towards the role of artificial intelligence in developing higher education. Therefore, we maintain the null hypothesis 0H: There are no statistically significant differences in students' responses about the impact of artificial intelligence on the development of higher education due to specialization at the level of α ≤ 0.05, and we reject the alternative hypothesis H1 There are statistically significant differences in students' responses about the impact of artificial intelligence on the development of higher education due to specialization at the level of 0.05. α≤ 0.05

2-3-4 Testing the main hypothesis: which came as follows:

- $_0$H There is no positive impact of artificial intelligence in its various dimensions (academic, research, technological/future) on the development of higher education in Algeria at the level of statistical significance. α≤ 0.05
- **H1** There is a positive impact of artificial intelligence in its various dimensions (academic, research, technological/futuristic) in

developing higher education in Algeria at the level of statistical significance. α≤ 0.05

The test results were shown in the following table:

Table (18): Results of testing the main sub-hypothesis.

Independent variable/dependent variable	**Higher education**			
	R	**²R**	**T**	**Significance level**
	0.646	**0.417**	**8.795**	**0.000**

Source: Prepared by the researcher based on SPSS outputs

The results of testing the main hypothesis indicate that the correlation coefficient (R = 0.646) indicates the existence of a relatively strong, direct correlation between artificial intelligence in its various dimensions (academic, research, technological/future) and the development of higher education in Algeria. The coefficient of determination (R^2 = 0.417) shows that the dimensions of artificial intelligence together explain about 41.7% of the variance in higher education, which reflects the fundamental impact of these dimensions in advancing university development. Also, the value of T = 8.795 and the level of significance (Sig = 0.000 < 0.05) confirm that the relationship is statistically significant, meaning that the impact of artificial intelligence on the development of higher education is impactful and strong.[#] Accordingly, the null hypothesis (H0) is rejected and the alternative hypothesis (H1) is accepted, which states that there is a statistically significant effect [illegible] intelligence in its various dimensions in [illegible]lgeria. Based on the statistical results, the researcher was able to formulate a simple linear regression equation, which came as follows:

$$y=7.10\times x+1.232$$

Where: **Y** represents higher education, the dependent variable, and **X** represents artificial intelligence in its various dimensions, the independent variable.

4. *Conclusion*

In conclusion, we tried in this article to shed light on the contribution of artificial intelligence to the development of education in general and higher education in particular, through an applied study in the higher education sector by addressing the opinions of Algerian students, where

Artificial intelligen

the dimensions of artificial intelligence (academic - research - technological and future) and its relationship to higher education in particular were analyzed, and in this study we reached the following results :

At the applied (field) level: The results of testing the sample hypotheses demonstrated that artificial intelligence has a significant positive impact on the development of higher education at a significance level of $\alpha \leq 0.05$. The results of the study also showed that the student respondents have a strong desire to adopt artificial intelligence applications in their university studies despite the existing challenges. The results also highlighted that human competencies (students, and Professors play a decisive role in the effectiveness (success) of applying artificial intelligence in the educational process.

Based on the results obtained, a set of recommendations can be presented, the most important of which is :

- Integrating artificial intelligence applications and tools into university curricula and digital libraries.
- Training students and professors in the field of using artificial intelligence applications
- Strengthening the digital infrastructure within Algerian universities

Given the limitations of the study, it opens the door for future studies in this field, as the scope of research can be expanded to include the following:

- ✓ The role of artificial intelligence in supporting the quality of scientific research
- ✓ The impact of artificial intelligence on intellectual capital in educational institutions
- ✓ The relationship between the quality of higher education based on artificial intelligence and the competitive capabilities of educational institutions

References

1 *Arwa bint Abdul Rahman bin Othman Al-Jaloud. (1444 AH). Provisions on applications of artificial intelligence in the judiciary (Volume, Edition*

2 *Muhammad Sabian . and Boumediene Tashma. (2023). The reality and prospects of Algerian-Turkish international cooperation in the sector of higher education and scientific research. Tabna for Scientific Academic Studies (No. 02).*

3 *Muhammad Eid Atris. (2018). Talent management in higher education in the United States of America and the possibility of*

benefiting from it in Egypt. Journal of Educational Administration (No. 20)..

4 *Mohammedy Ahmed Naseem. (2021). The New Intelligence Revolution (Volume 1st Edition). Batna, Batna, Algeria: Dar Idlis Belzma.*

Annex

Questionnaire Form Appendix

*The student "**Masrouki Bakhta**" puts in your hands this questionnaire to complete a discussion article on the contribution of artificial intelligence to the development of education, a field study in the higher education sector in Algeria from the perspective of students, for the purpose of obtaining a doctorate degree in business administration, and the student confirms the confidentiality of the data and information she will obtain from this questionnaire, and that it will only be used for scientific research purposes. The student would like to thank you very much for your interest in scientific research and your good cooperation to facilitate the mission*. Academic Year 2024/ 2025

Tick an **X** inside the box when the answer you think is appropriate for .each question

*The first axis: Personal information***:**

1) Gender *M* ☐ *emelle* ☐
2) Age

older than 36 years	from 31 to 35 years	from 26 to 30 years	Under 25 years

3) ☐ cialization *Sci* ☐ *ic*
Literary

The second axis:

a- Artificial Intelligence and Higher Education:

1. Do you use these technologies to get your work ☐e? ***Yes*** ☐ ***No***

2. Do these techniques provide you with the assistance y☐eed ? **Y**☐ ***No***

b- Higher Education:

1. Are the curricula keeping pace with the requirements of the labor market ?

Yes ☐ ☐***o***

2. Do you think there are enough opportunities for scientific research within the university ? ***Yes*** ☐ ***No***

The Third axis: The impact (relationship) between artificial intelligence and higher education in Algeria:

	Phrases (English)	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
01	The use of artificial intelligence contributes to improving teaching methods and providing innovative learning content.					
02	Artificial intelligence helps provide customized educational resources for each student (taking into account their different needs).					
03	Artificial intelligence helps improve communication between students and professors through smart systems.					
04	Artificial intelligence contributes to facilitating the evaluation of student performance more accurately.					
05	Data analysis by artificial intelligence enhances accurate academic decision-making.					
06	Artificial intelligence helps in analyzing research data faster and more accurately.					
07	Artificial intelligence contributes to improving the quality of practical research in university income.					
08	Artificial intelligence can support researchers by providing scientific recommendations based on previous research.					
09	Artificial intelligence encourages innovation in university research					

	projects.					
10	The use of artificial intelligence contributes to raising the level of technology within Algerian universities.					
11	Universities need to modernize the infrastructure for applying artificial intelligence technologies.					
12	Artificial intelligence helps in analyzing big data to improve educational performance.					
13	Artificial intelligence can bring about a major transformation in the higher education system in the future.					
14	Higher education in Algeria seeks to develop its curricula to keep pace with the challenges of the future.					
15	Higher education seeks to keep pace with global developments in the field of artificial intelligence.					
16	Higher education relies on technology to improve the quality of learning.					
17	Higher education encourages the adoption of innovative teaching methods.					
18	Higher education seeks to update curricula to keep pace with developments.					